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Report of the
Process Action Team #1

on

**Workforce Forecasting
and
Management Action
Planning**

March 1992



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Department of
Agriculture**



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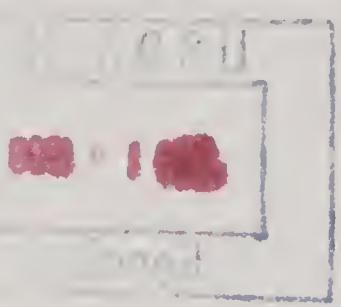
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Table of Contents

Executive Summary	1
Membership and Acknowledgements	3
Introduction	4
Mission of Process Action Team (PAT) #1	6
Development of Process Action Teams and the Approach Taken by PAT #1	7
A Workforce Forecasting System for ARS	8
Recommendations	17
Selected References	18
Appendices	
Appendix 1. General Expectations for Human Resource Management	20
Appendix 2. Abbreviations	21
Appendix 3. Factors Contributing to the Successful Implementation of a Workforce Forecasting System	22
Appendix 4. Existing ARS Activities Which Could Contribute to a Workforce Forecasting System	24
Appendix 5. Selected Process Models of Workforce Forecasting in Other Organizations Which Would be Useful in Developing ARS's Workforce Forecasting System	25
Appendix 6. Selected Databases Which Would be Useful in Developing ARS's Workforce Forecasting System	30
Appendix 7. Outputs and Users of the ARS Workforce Forecasting System	32

Executive Summary

A Human Resource Management (HRM) Task Force was convened by Dr. R. Dean Plowman, Administrator, in May 1990, and charged with the responsibility to provide an overall strategy to improve human resource management in the Agricultural Research Service (ARS). An Implementation Steering Committee (ISC) was formed in August 1991 to develop implementation plans for the Task Force recommendations. Six Process Action Teams were formed to develop implementation plans for different Task Force recommendations. This report presents the work of PAT #1, whose mission is **to describe a system for workforce forecasting and management action planning and propose an implementation plan.**

Of the many recommendations made by the HRM Task Force, **implementation of workforce forecasting** is a preeminent priority. Many of the Task Force recommendations depend upon the presence of a formalized method of projecting human resource needs. Four factors stand out as critical to the successful implementation of a Workforce Forecasting System (WFS). They are:

- Sustained top level support
- Commitment of the entire Agency leadership
- Availability of resources
- A good implementation plan

A Workforce Forecasting System for ARS.

The vision for the future is that ARS has a comprehensive, automated forecasting system that is used by ARS managers to effectively determine future workforce needs and by all employees to develop plans to meet those needs.

Four steps are proposed to design a comprehensive WFS which will be fully integrated with ARS strategic program and budget planning to increase HRM efficiency, and will be integrated with other human resources activities. These steps are summarized as follows:

Step 1 - Current Resources. Standard reports should depict the demographic profile and skills of the ARS workers **currently employed** to accomplish program objectives.

Step 2 - Future Resources. Standard reports should depict the demographic profiles and skills of workers **needed** to accomplish program objectives of the future.

Step 3 - Uses of WFS. Managers within ARS will have a WFS which will provide a mechanism to project how changes in mission, budget, personnel, and skills needs will influence their subordinate units.

In addition, the Agency will have a system which will allow access at all levels to view data on current and projected vacancies, current and projected skills needs, projected attrition, lists of current skills available, workforce demographics - current/projected, advancement opportunities, analysis of items by program objectives, and staffing plans.

Step 4 - Implementation Tracking. Implementation milestones would include a projected accomplishments scheme including predicted activities, decision points and timelines. It is envisioned that this scheme would be approved by the Administrator initially, and that decisions by the Operations Staff would follow at prescribed intervals.

Recommendations

ARS should implement an automated workforce forecasting and management action planning system. The essential elements for implementation should be -- 1) an automated system using decision support software and available databases; 2) top management support; 3) management accountability; 4) integration with other planning processes; 5) focus on major planning issues, and 6) a simple, systematic, and well documented process using good data and allowance for measurable results.

Specific recommendations for implementation of the WFS include:

- Designate and empower a person/group to manage the development of a WFS. (Administrator Designee)
- Assemble the expertise necessary to prepare design criteria for the WFS.
can we do this?
- Contract for system development, presentation of options, benefit/cost ratios and phasing.
- Design and develop test procedures for OA, NPS, AM, Area Offices, Research Centers, Locations, Management Units and employees.
- Pilot test in selected organization units (includes limited training).
- Develop comprehensive training programs.
- Develop Agency-wide implementation schedule.
- Establish feedback pathways for system evaluation and documentation.

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Introduction

A Human Resource Management (HRM) Task Force was convened by Dr. R. Dean Plowman, Administrator, in May 1990, and charged with the responsibility to provide an overall strategy to improve human resource management in the Agricultural Research Service (ARS). Dr. Plowman charged the HRM Task Force to:

- Develop a comprehensive and coordinated strategy for managing ARS human resources.
- Formulate a statement of Agency mission, goals, and objectives.
- Suggest an overall implementation plan.

The Task Force was also asked to examine critical issues and challenges which confront the ARS in a changing research environment and to make recommendations to best meet those challenges.

In consultation with O. D. Systems, Inc., a consulting firm that specializes in HRM, the Task Force developed a common understanding of human resource management and studied the human resource management experiences of other public and private sector research organizations. This enabled the Task Force to produce the following mission statement:

The Human Resource Management mission of the ARS is to support the Agency's mission by ensuring research excellence through a total organizational commitment to the maintenance of an effective and diverse workforce.

The Task Force focused on four major areas, and from these, delineated six major objectives for action. These four major focus areas cover:

- Workforce forecasting
- Recruitment and career development
- Recognition and rewards
- Quality of worklife

Six primary objectives within these four focus areas were identified, and action plans were devised to accomplish each objective. An Implementation Steering Committee (ISC) was formed in August 1991. In a September meeting of the ISC, Process Action Teams (PATs) were formed for each of the six primary objectives shown below:

1. Develop and implement a workforce forecasting and staffing system
2. Design and implement a comprehensive outreach and recruitment program
3. Create a qualified and diverse pool from which Agency supervisors and managers can be selected

4. Establish effective career advancement and employee development programs
5. Strengthen the use of evaluation and reward systems to recognize positive accomplishments in human resource management
6. Create a comprehensive program encompassing aspects of employee compensation, benefits, and quality of life

This report presents the work of PAT #1, Objective 1 - Develop and Implement a Workforce Forecasting and Staffing System: The ARS has developed and uses the ARS Program Plan: 6 Year Implementation Plan as the basis for implementing Agency research programs. Although the plan serves as a model for determining research priorities for agriculture, it does not address future personnel or facilities needs. Program goals for research and administration can only be met with a satisfactorily trained and motivated workforce. Therefore, multi-year planning for human resource management should become an integral part of strategic planning within the Agency. Strategic planning for human resource management in conjunction with strategic planning for research will enable the ARS to be responsive to changes, both in national policy and the workforce.

Mission of PAT #1

To describe a system for workforce forecasting and management action planning and propose an implementation plan:

Specific Actions Coming From Implementation of an ARS Workforce Forecasting and Management Action Planning System	
ACTION	Lead Responsibility
Establish an ARS workforce forecasting system	
Complete a skills assessment to augment information on current workforce status and composition.	PD/Employees
Use the skills assessment information to project changes in the Agency workforce and integrate the results with strategic planning for research and administration.	NPS/AD's/AM
Identify personnel requirements and projected vacancies for current and future research and administrative programs.	NPS/AM/AD's
Communicate long- and short-range workforce projections to increase awareness of career opportunities.	AD's/NPS
Establish a comprehensive and dynamic staffing plan	
Develop critical path analysis for program implementation and coordination with projected personnel needs.	NPS
Consider reassignment, retraining, and/or redeployment of current personnel to achieve program goals and needs.	AD's with NPS/RL's/AM
Establish effective external recruiting initiatives.	Recruiter/EEO Staff/Line Managers
Use the staffing plan to address program needs.	
Encourage tactical goal setting, strategic planning, and team building at all managerial levels.	Area
Provide educational and training opportunities to meet future human resource needs.	All Locations MU's
Use flexitime, job sharing, and flexiplace strategies to optimize use of individual talents and increase productivity.	All Locations MU's
Consider consortium research programs to expand facilities and satisfy equipment needs.	NPS
Implement cross-functional programs within and among locations for more effective problem solving.	NPS/AD's
Encourage use of sabbatical and fellowship programs for ARS personnel and visiting scientists.	NPS/All Locations
Reconcile forecasting and staffing system projections with updated program plans, and evaluate effectiveness of these systems.	NPS/AD's/AM

Development of Process Action Teams and the Approach Taken by PAT #1

A PAT consisted of Co-chairs from within the ISC and carefully selected members nominated by AD's, AM Division Heads and NPL's. Co-chairs were delegated the responsibility to orient members and manage independent PAT activities to deal with respective assignments. In the case of PAT #1:

- An introductory conference call was made and information related to PAT #1's mission was mailed.
- A team building session was conducted by O. D. Systems, Inc.
- A work session was conducted to delineate approach, objectives, work assignments and timelines; work assignments included the identification and evaluation of workforce forecasting and database systems currently in use or in the process of being put in place by other organizations. (See Appendix 5 and 6 for summary reports of this activity.)
- Periodic conference calls were held to chart progress and update assignments.
- A draft report was prepared and reviewed by the PAT.
- A meeting was convened to finalize report and formulate recommendations.

A Workforce Forecasting System for ARS.

Introduction

The PAT #1 on WFS has evaluated its contribution to HRM in ARS and its position relative to the other PATs. HRM includes the activities studied by all the PATs.

Primary Objectives of Process Action Teams.	
PAT Number	Objective
PAT #1	Develop and implement a workforce forecasting and staffing system.
PAT #2	Design and implement a comprehensive outreach and recruitment program.
PAT #3	Create a qualified and diverse pool from which Agency supervisors and managers can be selected.
PAT #4	Establish effective career advancement and employee development programs.
PAT #5	Strengthen the use of evaluation and reward systems to recognize positive accomplishments in human resource management.
PAT #6	Create a comprehensive program encompassing aspects of employee compensation, benefits, and quality of life.

Vision Statement. The vision for the future is that ARS has a comprehensive, automated forecasting system that is used by ARS managers to determine effectively future workforce needs and by all employees to develop plans to meet those needs.

Goal Statement. The goal is to design an implementation plan for a comprehensive WFS which will be fully integrated with ARS strategic program and budget planning, will be used to increase HRM efficiency, and will be integrated with other human resources activities as outlined by other PATs.

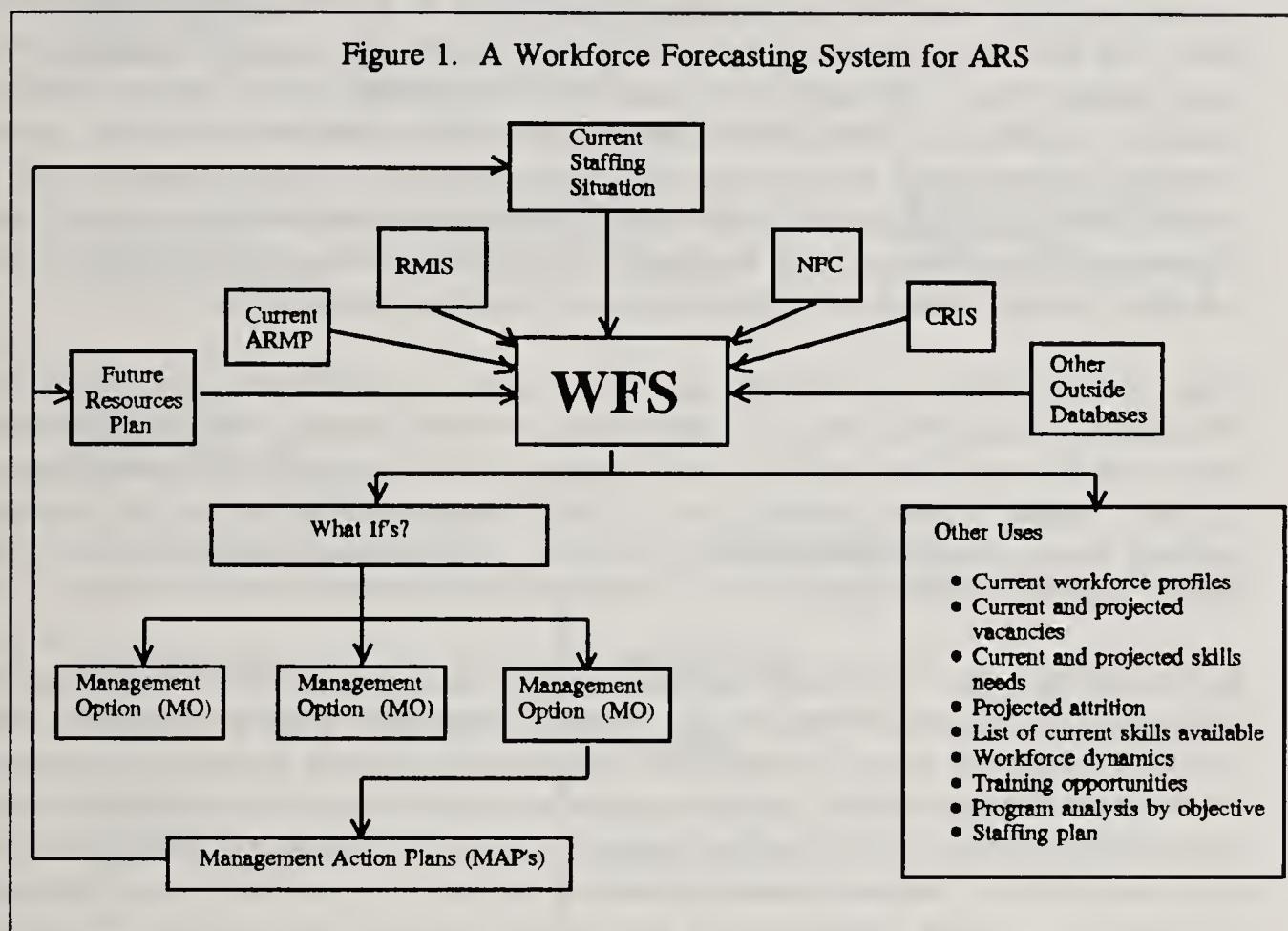
Objective. The objective of this section is to describe the development of an ARS WFS. There will be four steps in developing the WFS:

- Develop an automated system to collate, summarize, report and integrate with other activities, the **Current Resource Inventory**.
- Develop an automated system to collate, summarize, report and integrate with other activities, the **Future Resource Needs**.

How?

- Define Uses for a WFS.
- Develop a WFS Implementation tracking system.

A diagrammatic representation of the WFS for ARS is shown in Figure 1.



Current Resources- Step 1 of Workforce Forecasting

Key Issue. What is the status of the present workforce?

Data Requirements and Sources. Information will be needed to obtain a *snapshot* of the current workforce and should include, at a minimum, the types of workers, available skills, EEO profile, geographical location, grades, organizational location, age distribution and workload/productivity measures. Other useful information will include turnover rates, potential retirements and promotions, transitional data (career progression, internal transfers and reassignments), retention data and supervisory/management strengths.

Some data sources are currently available; others must be developed. The sources mentioned below have been identified in a previous section ("Selected Databases"). The ARS Program Plan: Six-Year Implementation Plan should serve as the guide for ARS program objectives. The NFC Personnel Database has been identified as critical for data relating to personnel. It includes information on payroll/personnel and salary,

education level, position management and history. The ARS WorkForce Profile 1990 contains critical data regarding the current ARS workforce and includes a ten-year history. The NSF Database may be useful because it contains information on student demographics and graduate demographics for all degrees.

Many data are not presently available in a useful form. A skills assessment of the current workforce must be developed and conducted at the Management Unit (MU) level. The skills assessment may be derived from an individual's SF 171 or Individual Development Plan. The skills data would be summarized in the Current Staffing Situation (Figure 2); The Current Staffing Situation would be a standard report containing a traditional staffing plan, a budget summary, a skills summary and a mission statement. The position boxes would list the individual, grade level, salary and eligible retirement date, etc. A tagging system could be designed to indicate if the individual wishes to relocate within the Agency or retrain in other skills.

Other data sources not presently available, could be included which reach the Management Unit (MU) level on a predictable schedule including tracking documents for human resource plans by MU, ARMP State of Unit statement of needed human resource, human resource tracking within CRIS documentation and human resource tracking within protocols of long-range projects. Also human resource tracking from RMIS could be a data source.

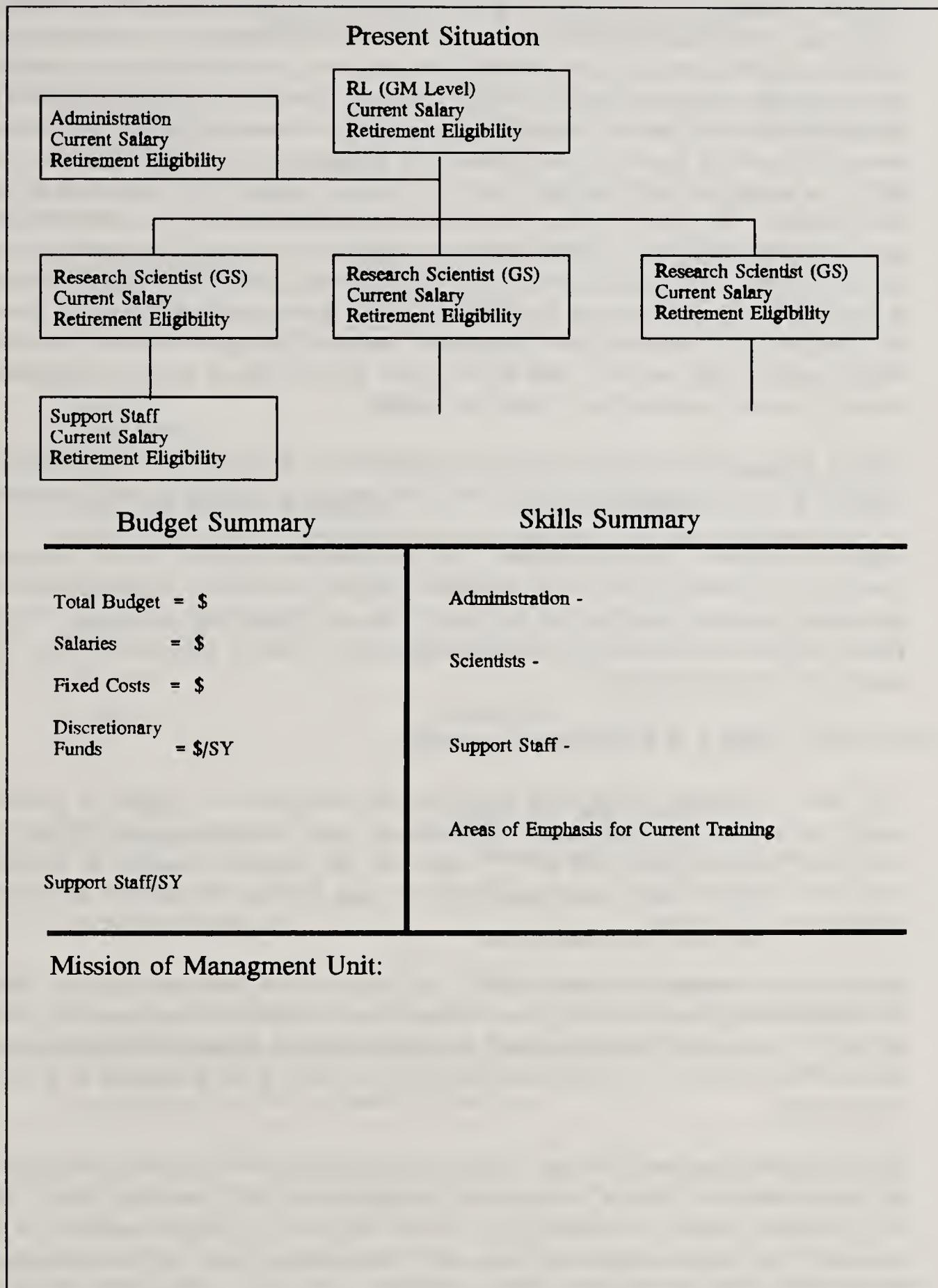
System Design. The WFS should include a centralized automated information database using decision support software which combines information relative to available data sources as discussed above. Management officials and planners should have access to the database through specific software programs and the ability to do standard reports and statistical analyses including forecasting the supply of people and human resource skills within ARS. Various manual systems or databases not presently available could be developed. Skills assessment of the current workforce is required. Tracking documents for human resource plans of MUs and an ARMP State of the Unit statement of needed human resources could be developed. Any long-range projects could include an human resource tracking document to identify human resource needs. These latter three devices are direct feedback from the field level and are considered to be extremely important to the success of the ARS WFS.

Current Resources - The End Result. The final standard reports or Current Staffing Situation (Figure 2) should depict the demographic profile and skills of the ARS workers currently employed to accomplish program objectives. It is anticipated that other areas of ARS HRM Program would integrate its information or receive information from the automated system developed.

Future Resources- Step 2 of Workforce Forecasting

Key Issue. What people will be needed to manage and do the work in the kind of organization and the operating environment that management envisions over the next five to ten years?

Figure 2. Current Staffing Situation



*now far in
future
will level?
MO level?
SA's
de we ne.
standard
t, inventory
menu?*

Data Requirements and Sources. The organizational structure should reflect changes in missions, programs and objectives. Positions should be defined as the number of budgeted positions and a comparison with the number of workers needed to accomplish ARS goals. The optimum productivity levels needed to accomplish the work envisioned and the workforce impact, if any, should be determined. An assessment of occupations and knowledge, skills and abilities (KSAs) based on changes in technology needed to accomplish the work will be required. Once KSAs are determined, levels of expertise needed to meet the workload and productivity requirements can be developed. The KSA's of supervisors and managers needed to ensure meeting ARS objectives should be developed. Occupations where under-representation exists should be identified and barriers to acquiring the appropriate balance should be eliminated. Data sources would be the same data sources outlined for the identification of Current Resources. However, in place of the Current Staffing Situation, the Future Resources Plan (Figure 3), would be a standard report resulting from the input of projected changes in mission, positions, budget and/or skills needed. This activity may involve use of out-year projections derived from the proposed new multi-year ARMP.

System Design. The centralized automated information database described earlier for identifying Current Resources would be the same vehicle to identify Needed Resources.

Future Resources - The End Result. The final standard report or Future Resources Plan (Figure 3) should depict the demographic profiles and skills of workers needed to accomplish program objectives of the future. It is anticipated that other areas of ARS HRM Program would integrate their information or receive information from the automated system developed.

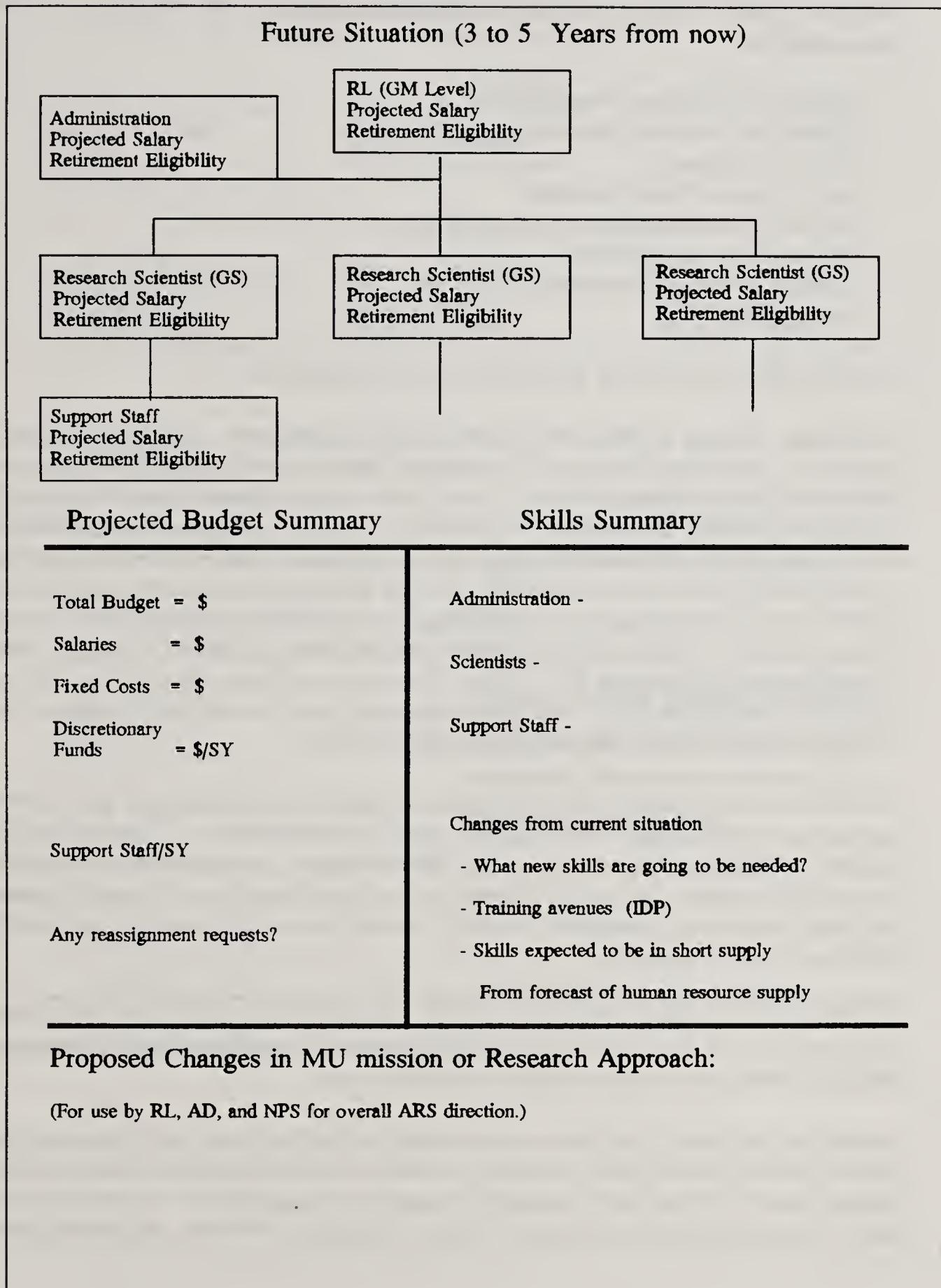
Uses of WFS - Step 3 of Workforce Forecasting

Key Issue. Managers within ARS need a system to project how changes in mission, budget, personnel, and skills needs will influence their subordinate units (Figure 1). The major planning questions are: 1) what are the projected changes in mission, personnel, budgets, skills, and 2) how will the gaps between the present and future situations be reconciled?

Definitions. Management Options (MO) (see Figure 4) are generated through "What If" analysis using the WFS. They are standard outputs which illustrate possible future workforce scenarios. The MO chosen for implementation becomes the Management Action Plan (MAP). The MAP integrates into the WFS at the point/time it is to be implemented.

Data Requirements and Sources. Outputs and information from the WFS will provide the needed data for "What If" analysis and development of MO's and final MAP. The MAP includes a traditional staffing plan, but will also include a budget summary, skills summary, and mission statement (Figure 4). The position boxes will list individual, grade level, salary, and eligible retirement date, etc. A tagging system will be designed to indicate if the individual wishes to relocate within the Agency or retrain in other skills.

Figure 3. Future Resources Plan



System Uses. The WFS will be used by the Administrator, OP staff, NPS, AM, Area Directors, Center Directors, Locations, Management Units, and employees to view information on:

- Current and Projected Vacancies
- Current and Projected Skills Needs
- Projected Attrition
- List of Current Skills Available
- Workforce Demographics - Current/Projected
- Advancement Opportunities
- Analysis of Items by Program Objectives
- Staffing Plan

Access to the system will be provided on an as needed basis.

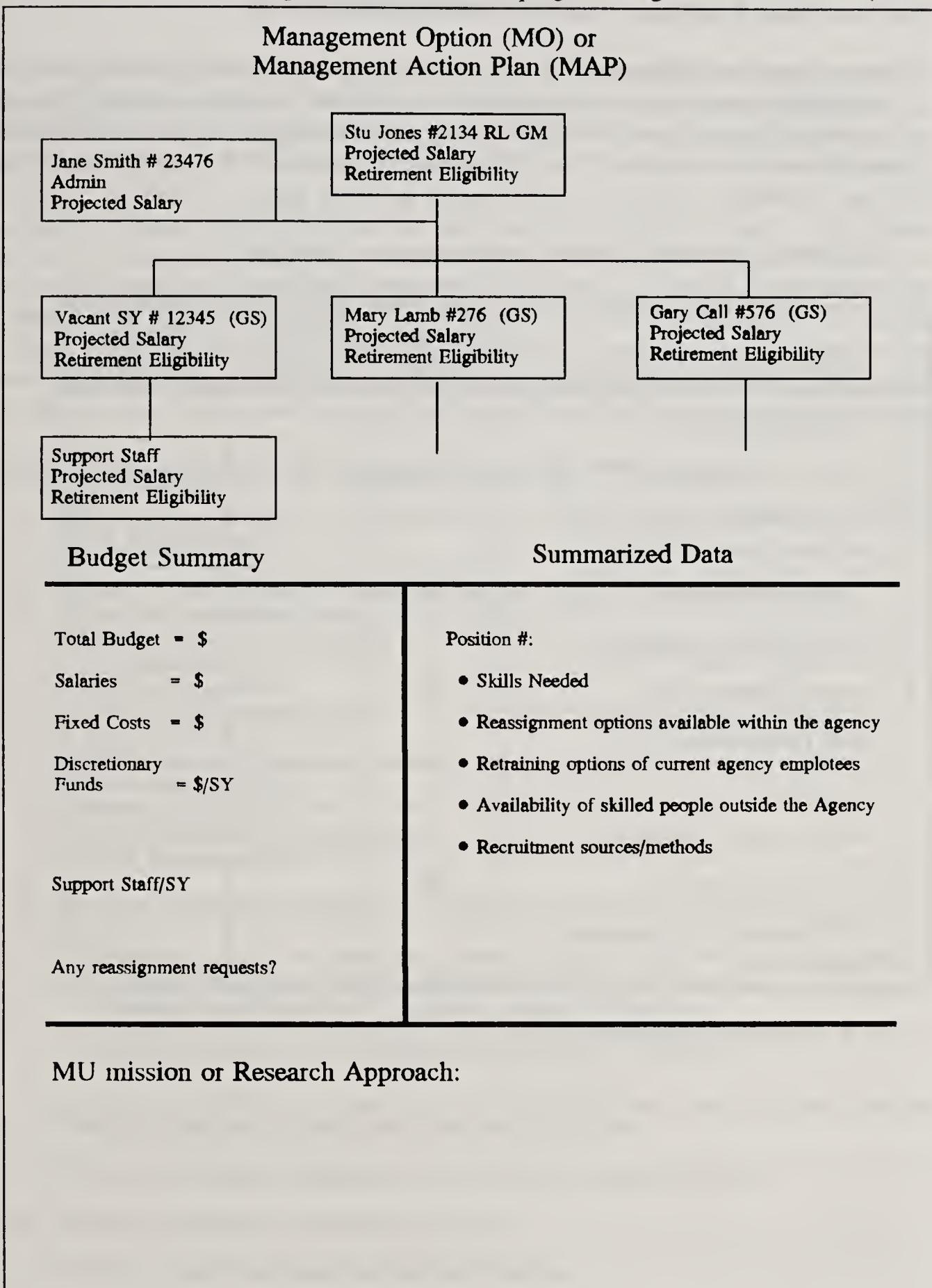
In addition, through a "What If" process, the MU fundholder, AD, and NPL, could input into a screen possible changes in mission, funding level, or personnel to retrieve possible MO's for implementation. Critical ratios such as discretionary funds per SY and support staff per SY can also be projected. Training needs can also be identified. With the appropriate software development such a system would allow sorting of data by Area, skill, plan objective, lead NPL, etc. At the higher levels of the organization, the MO would display numbers of individuals in a particular category (e.g., research leaders, scientists, technicians) and average other data such as salaries, retirement dates, or discretionary dollars per SY. Such a system would also allow review of how changes in staff and/or budget will influence an MU and how shifting resources from one MU to another might influence each individual unit.

The MO chosen for implementation becomes the MAP for inclusion back into the WFS database at the point/time it becomes the final decision (Figure 1). The MO's/MAP projects staffing plans into the future and contain budget summaries, skills summaries and mission statements as well as addressing mobility of employees, interest in training for current employees, availability of skills needed from outside sources, and possible recruitment methods/sources.

Workforce Forecasting - The End Result. Managers within ARS will have a WFS which will provide a mechanism to project how changes in mission, budget, personnel, and skills needs will influence their subordinate units.

In addition, the Agency will have a system which will allow access at all levels to view data on current and projected vacancies, current and projected skills needs, projected attrition, lists of current skills available, workforce demographics - current/projected, advancement opportunities, analysis of items by program objectives, and staffing plans.

Figure 4. Management Option (MO) for developing a Management Action Plan (MAP)



Implementation Tracking - Step 4 of Workforce Forecasting

Implementation Milestones. Implementation milestones would include an initial projected accomplishments scheme including predicted activities, decision points and timelines. It is envisioned that this scheme would be approved by the Administrator initially, and that decisions by the Operations Staff would follow at prescribed intervals.

Workforce Forecasting System Implementation Tracking.

Implementation Milestones	Decision Points	Planned Start Date	Planned End Date
1 Technical Approval	XX		
2 Resource Allocation	XX		
3 Detailed WFS Design -- Software Systems Design			
4 Resource Allocation	XX		
5 WFS System Development			
6 Resource Allocation	XX		
7 MAP Development			
8 Pilot Study			
9 WFS Program Evaluation			
10 Resource Allocation	XX		
11 WFS Program Implementation Agency Wide			

XX = Milestones or decision points

Recommendations

ARS should consider adopting an automated workforce forecasting and management action planning information system. The essential elements for implementation should be -- 1) an automated system using decision support software and available databases; 2) top management support; 3) management accountability; 4) integration with other planning processes; 5) focus on major planning issues, and 6) a simple, systematic, and well documented process using good data and allowance for measurable results. Established time tables and phases for implementation will be needed. Computer specialists should be identified to work in a planned and coordinated fashion and to establish a national network of information; the system should be user friendly with systematic organization for input; it should allow for all types of quantitative information and raw data; it must be kept current with frequent updates and include a mechanism for data validation; and it must meet the needs of current and future ARS Program Plan: Six-Year Implementation Plans.

Specific recommendations for implementation of the WFS include:

1. Designate and empower a person/group to manage the development of a WFS.
(ARS Administrator)
2. Assemble the expertise necessary to prepare Design Criteria for the WFS.
 - Hardware specialist
 - Program analyst (consultant)
 - Programmers
 - Training specialists
 - Contracting specialists
 - Representatives of users
 - ADP rules and regulations authority
 - Personnel Specialist
 - EEO Representative
 - Labor Relations Representative
 - OPM Representative
3. Contract for system development, presentation of options, benefit/cost ratios and phasing.
 - Provision should be made for precontracting evaluation of bidders directly involving the Design Criteria group described in item 2 above.
 - Contract should provide for periodic progress evaluation.
 - Contract should be based upon system performance specifications.
 - Require contractor to have previous HRM design experience.
4. Design and develop test procedures for OA, NPS, AM, Area Offices, Research Centers, Locations, Management Units and employees.
5. Pilot test in selected organization units (includes limited training).
6. Develop comprehensive training programs.
7. Develop Agency-wide implementation schedule.
8. Establish feedback, system evaluation and documentation.

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Appendix 1. General Expectations for Human Resource Management

Commitment at all levels. Adherence to the principles and goals of HRM by all ARS employees is critical. Concurrently, adequate financial and personnel resources must be allocated to the HRM effort. Employees and cooperators must be made aware of the excellent job performance and spirit inherent in ARS employees.

Concurrence with OPM and USDA/OP. The Agency must coordinate its HRM efforts with these bodies which have oversight over Government and USDA HRM activities. Failure to advise these agencies could result in moving in directions contrary to official policy.

Designate and empower a person or group to manage the development of an HRM program. It is necessary that HRM have strong leadership as well as top level support. Possible leadership alternatives to be used singly or in combination are:

- HRM Executive Steering Committee
- HRM Advisory Committee that cross cuts over all disciplines
- HRM Staff like the ARS Operations Staff
- Associate Administrator for HRM reporting directly to the Administrator.
- Human Resource Division (HRD).

Contract for an HRM conceptual model. It is not anticipated that current ARS staff will have sufficient expertise to develop a far-reaching document that can be handed to developers. It will therefore be necessary to seek outside advice from an organization experienced in developing requirements for a human resource system.

A successful outreach program. Partnerships should be created with the following groups for mutual assistance in finding people for the right job at the right time:

- Other federal agencies
- Various organizations including (1) Educational (primary, secondary, and higher education), (2) Professional and scientific societies, (3) the Community, and (4) Industry.

Appendix 2. ABBREVIATIONS

AC	-	Administrator's Council
AD	-	Area Director
AM	-	Administrative Management
APHIS	-	Animal and Plant Health Inspection Service
APM	-	See USPS in report (p. 14)
ARI	-	Agricultural Research Institute
ARMP	-	Annual Resource Management Plan
ASCS	-	Agriculture Stabilization and Conservation Service
AT&T	-	American Telephone and Telegraph
BLS	-	Bureau of Labor Statistics
CER	-	Corporate Education Resources, Inc.
CRIS	-	Current Research Information Systems
DOD	-	Department of Defense
DOE	-	U.S. Dept. of Education
DOL	-	U.S. Dept. of Labor
ED	-	U.S. Dept. of Education
EEO	-	Equal Employment Opportunity
FTE	-	Full Time Equivalency
FS	-	Forest Service
GAO	-	General Accounting Office
GRE	-	Graduate Record Exam
HRD	-	Human Resources Division, APHIS
HRM	-	Human Resource Management
IBM	-	International Business Machines, Inc.
IPEDS	-	Integrated Postsecondary Education Data
ISC	-	Implementation Steering Committee
ISCD	-	Information Systems and Communication Division
KSA	-	Knowledge, Skills, and Abilities
LMR	-	Labor Management Relations
MAP	-	Management Action Plan
MO	-	Management Option
MSS	-	Management Support System
MU	-	Management Unit
NASA	-	National Aeronautics and Space Administration
NFC	-	National Finance Center
NIH	-	National Institutes of Health
NPL	-	National Program Leader
NPS	-	National Program Staff
NRC	-	National Research Council
NSF	-	National Science Foundation
OP	-	Office of Personnel, USDA
OPM	-	U.S. Office of Personnel Management
PAT	-	Process Action Team
PD	-	Personnel Division
PSP	-	Position Staffing Plan
RL	-	Research Leader
RMIS	-	Research Management Information System
R&PM	-	Resource and Program Management
SAT	-	Scholastic Aptitude Test
SY	-	Scientist Year
TVA	-	Tennessee Valley Authority
USPS	-	U.S. Postal Service
WFPIS	-	Workforce Planning Automated Information System
WFS	-	Workforce Forecasting System
WPM	-	Workforce Planning Model, USPS
WSHA	-	Worker Safety and Health Administration

Appendix 3. Factors Contributing to the Successful Implementation of a Workforce Forecasting System.

Of the many recommendations made by the HRM Task Force and others within the Agency who have critiqued the HRM Task Force Report, **implementation of workforce forecasting**, is a preeminent priority. Indeed many of the Task Force recommendations depend upon the presence of a formalized method of projecting human resource needs. This task is also one which will require significant infusion of resources, philosophical support of the entire ARS leadership, and a good implementation plan. Accordingly, four factors stand out as critical to the successful implementation of a Workforce Forecasting System (WFS). They are:

2. • Sustained top level support
1. • Commitment of the entire Agency leadership
4. • Availability of resources
3. • A good implementation plan

Those experienced with the implementation of HRM activities always emphasize the need for **Top Level Support**. The ARS HRM Task Force Report presents this factor as the most important and, in fact, this has been a major theme of the ARS HRM initiative since its inception. The HRM Task Force, drawing upon the experiences and pertinent surveys of O. D. Systems, Inc., cited the special importance of the Administrator and his office in the implementation process.

Dr. R. D. Plowman, ARS Administrator accepted, embraced, and transmitted to the Administrator's Council (AC), the principles and concepts set forth in the Task Force report. Tangible evidence of the Administrator's personal support is (1) formation of the HRM Implementation Steering Committee in August, 1991; (2) commitment to the HRM implementation process in the Administrator's Newsletter; and (3) inclusion of improved HRM as a priority in the ARS Program Plan: 6-Year Implementation Plan 1992-1998.

Nearly as important as top level support is **Commitment of the Entire Agency Leadership**. Organizational resolve is personified by the organizational leadership and no amount of support at the subordinate levels can compensate for executive apathy. Technical input from Agency executives will guide the development of the WFS, for the leaders of ARS will be the principal (albeit not at all the only) users and beneficiaries of the WFS. Most importantly, presentation of the HRM Task Force to the AC, and subsequently to Research Leaders (RL), resulted in broad-based expressions of support for the recommendations therein. Commitment of discretionary resources managed by these Agency leaders is yet to be determined. It is encouraging, however, that initial contacts indicate enthusiasm and optimism with regard to system-wide workforce forecasting and management action planning.

Of the many recommendations embodied in the HRM Task Force Report, those related to implementation of WFS will require **Availability of Resources**. Failure to commit the necessary budgetary resources for development of sophisticated software, provision of appropriate and strategically placed hardware, and opportunity for training and user feedback could lead to failure of the WFS and other aspects of HRM dependent upon its success. Failure to commit the necessary manpower resources (including executive and managerial manpower resources) could lead to an inefficient and user-unfriendly system doomed to suboptimal performance.

In light of the importance of the above cited factors, a **Good Implementation Plan** is clearly needed. It is the purpose of PAT #1 and this report to provide such a plan. Strategic timing for provision of leadership initiatives, resource allocations and progress/accomplishments/expectations assessments is included in the implementation plan. It is the sense of PAT #1 membership that if these four factors are dealt with effectively, then a WFS for ARS will enhance the ability of the Agency to fulfill its HRM objectives and achieve its research mission.

Appendix 4. Existing ARS activities which could contribute to a Workforce Forecasting System.

The major activity in the ARS that involves workforce forecasting is the Annual Resource Management Plan (ARMP). ARMP has three main parts: Funding, Personnel Management, and Assistance and Acquisition.

The Position Staffing Plan (PSP) is a major vehicle for workforce forecasting. It is begun at the research Management Unit (MU) level and is approved at the Area level before being presented to Headquarters for final approval. The PSP is a listing of the proposed staff in a given MU on October 1 of the next fiscal year. Here, Research Leaders and other fund holders project new positions, attrition, and other changes to the staffing plan.

An examination of key ratios dealing with the financial viability of an MU also takes place. Ratios dealing with discretionary dollars per Scientist Year (SY) and total dollars per SY can indicate resource limitations and suggest that funding and/or personnel changes are warranted.

Once each ARMP package has been prepared by the MU, it is reviewed by the Area, the NPS and AM divisions before being submitted to the Administrator for approval. Key personnel who are identified as needing placement due to insufficient funds are matched when possible to existing or potential vacancies. Area Directors and the National Program Leaders ultimately make recommendations to the Administrator on potential reassessments.

The ARMP planning period covers one year. The ARS Program Plan: 6-Year Implementation Plan 1992-1998 recommends that planning take place for more than one fiscal year and this option is being explored. The ARS has formed a multi-year planning Task Force to formulate a recommendation for types of data that need to be captured in the outyears. A major component of multi-year planning is position management planning.

To capture ongoing position management data, the Agency relies upon personnel data residing at the USDA National Finance Center (NFC). These data are primarily captured via the various personnel actions that take place during a fiscal year. Using these data, the Personnel Division (PD) can produce a wide variety of reports. A good example of available reports is the annual Work Force Profile.

Another existing activity is the Research Management Information System (RMIS) used by program managers of ARS. RMIS uses personnel data to link personnel to CRIS work projects.

Appendix 5. Selected Process Models of Workforce Forecasting in Other Organizations Which Would Be Useful in Developing the ARS Workforce Forecasting System.

The following workforce forecasting process models from government agencies and other institutions were surveyed and evaluated for applicability to ARS needs:

USDA Agricultural Stabilization and Conservation Service (ASCS)
USDA Animal and Plant Health Inspection Service (APHIS)
USDA Forest Service (FS)
US Dept. of Defense (DOD)
US Dept. of Labor (DOL)
National Institutes of Health (NIH)
US Postal Service (USPS)
Executive Information (NOAA)
Worker Safety and Health Administration (WSHA)
Tennessee Valley Authority (TVA)
Agricultural Research Institute (ARI)
National Research Council (NRC)
Hudson Institute
Resources Community and Economic Development Division (GAO)
University of Georgia
American Telephone and Telegraph (AT&T)
Hershey Foods, Inc.
Smith, Kline & Beecham, Inc.
Agri-tech, Inc. (Kansas City)
Buckeye Cellulose, Inc. (Division of Proctor & Gamble)
London House, Inc.
General Time, Inc.
Conceptual Systems, Inc.
International Business Machines (IBM)
ABB Electric, Inc.
Corporate Education Resources, Inc. (CER)

Findings:

APHIS and DOL seem to have the most applicable systems for the ARS to consider. These systems are briefly discussed below:

- APHIS envisions a comprehensive, automated workforce planning project which will be used to effectively determine its future workforce needs and develop plans to meet these needs. The proposed planning process includes five important steps -
- 1) forecast supply of human resources; 2) ~~forecast demand for human resources;~~ how do
3) develop management plans to bridge the gap between supply and demand; 4) develop control data to evaluate accuracy and effectiveness; and 5) estimate costs.

Purpose:

The APHIS Workforce Planning Automated Information System (WFPIS) will provide Agency managers and planners with an automated implementation tool to improve management decisions within APHIS relevant to good workforce planning and forecasting. This includes retaining and recruiting the right personnel essential for meeting the Agency tasks of the future. The automated system describes a demographic profile of the Agency workforce. Decision support software will provide the ability to do statistical analysis, including forecasting the supply of people and human resource skills within the Agency. Additional features include the ability to provide trend and regression analysis. The system will be designed to merge National Finance Center (NFC) data with data from other sources. The data will be available to management officials in two ways. First, managers will have access to data for their own organization. They will be able to view the data and manipulate and analyze the data to fit individual needs and do forecasting and other analysis. Second, basic information will be available through a Management Support System including standard reports, charts, graphs, etc., showing most commonly needed information.

The responsible unit for automation of the WFPIS is the Management and Budget Unit, Human Resources Division (HRD) of APHIS. The APHIS HRD has been working collaboratively with the Information Systems and Communication Division (ISCD) to develop the automated workforce planning information system. HRD provides ISCD data downloaded from NFC and samples of previously used reports and graphs, as well as developing new enhancements and additional data. ISCD will provide the necessary programming expertise and HRD the subject-matter and technical expertise.

Summary:

The workforce planning automation project will support the overall management of the human resources of APHIS and will provide management with an implementation tool for integrating human resource planning with other planning systems within the Agency, including strategic planning, operational planning, and budget planning. It aids in efficient and effective recruitment, identifies training and developing needs, provides succession planning information, and identifies EEO and workforce diversity needs.

- The Department of Labor (DOL) has produced a Guide for the Department which provides a systematic, thorough, and documented management process for Human Resource Planning.

Purpose:

The Human Resources Planning Guide describes how human resource planning is integrated with program, workload and budget planning. It defines necessary steps to be taken in implementing such an effort and identifies tools available to assist managers in developing Human Resource Plans. The Guide also provides several useful Appendices containing - 1) a list of tools, information, and staff resources available; 2) human resource summary and forecast; and 3) a checklist for human

resource planning. The Guide notes that the primary responsibility for identifying emerging trends and changes in the organizational requirements relating to Program Plans and objectives rests with managers. However, it is recognized that staff support to managers is needed and the budget, personnel, program analysis, and management analysis staffs should all have pertinent input. Further, the staff should be able to assist managers in 1) analyzing program plans and objectives; 2) specifying workload and productivity measures; 3) identifying human resource issues; 4) obtaining and analyzing pertinent human resource information; and 5) performing forecasting activities such as the analysis of skill needs, turnover, retirements, transfers, and promotions.

Summary:

It is vitally important to determine and assure that the organization will have the right people at the right time in the right place meeting organization goals. The DOL Human Resource Plan involves a 4-step process that includes: 1) developing specifications for the kinds, numbers and location of workers and managers in order for the organization to accomplish its mission, goals and objectives (needed resources); 2) determining how well the current workforce will be able to meet projected needs over time (current resources); 3) identifying gaps between the needed workforce and the projected available resources, and formulating plans to minimize or eliminate these gaps (management action plans); and 4) surfacing labor management relations (LMR) and costs associated with implementing the Human Resource Management Action Plan (LMR/cost implications). how ?

- Other contacts with useful information are noted below.

Contact with the USDA Forest Service yielded a document entitled "Toward a Multicultural Organization - Report of the USDA Forest Service Task Force on Workforce Diversity, March 1991" and included goals and strategies. The document might be of interest to the ARS overall objectives and aims in human resource management.

A contact involved with succession planning for TVA recommended a software package (Executive Track II, Corporate Education Resources, Inc) being used in that organization. Executive Track II is designed to keep track of succession planning in management positions, but it could easily be utilized at other levels (Hershey Foods, Inc. is a good example of an organization using it at lower levels with success). Skills assessments can be broken up into separate groupings with each containing up to 180 weighted categories. Provided the ARS current CRIS/Personnel data is in an appropriate format, these could be converted for use in Executive Track databases.

The WSHA provided a document describing its Human Resource Plan (FY 1991 Planning Cycle) that included strategy descriptions. In order for WSHA to have the workforce necessary to carry out its mission presently and in the future, several human resource actions are being undertaken to meet short- and long-term workforce needs: 1) recruitment; 2) training; 3) awards and bonuses; 4) succession

planning; 5) employee development; 6) relocation; 7) contracting out/A-76; and 8) labor relations impact.

NASA provided a copy of the applications of human resources relevant to their workforce planning/modeling system. The application provides for the capability to plan, analyze, and manage the NASA workforce (including both civil service and contractor personnel). It would maintain data on the current workforce, as well as project changes in future work requirements (task dynamics), would support projections of anticipated changes in the workforce composition (workforce dynamics), would support management of FTE and R&PM budget usage, as well as development of hiring plans, and would provide decision support and modeling capabilities to enhance management decision-making.

The NIH provided a document which may be useful in the development of a workforce forecasting model. This workforce planning model was developed for the Secretary's Special Emphasis Oversight Committee on Science and Technology as one of a number of tools to be used by Health and Human Services (HHS) agencies in carrying out the Committee's advice on implementing the recommendations of the Task Force on Women, Minorities, and the Handicapped in Science and Technology. The model projects approximate rates of gains and losses for the next several years. As stated, the purpose of the projections is to show the likely number of positions that will be included in each occupation and in groups of related occupations.

The USPS provided a copy of their workforce planning model (WPM) which uses the EXPRESS software. The WPM describes the impact of automation on workforce requirements through 1995, and works in tandem with their APM (APM simulates mail processing operations at sites within a division and allows for evaluating different mail processing strategies). The WPM takes the data generated by APM and the information supplied and uses them to determine workforce requirements. APM and WPM are therefore strategic planning tools.

Several commercial companies can provide software packages for workforce planning automation projects (e.g., EXPRESS): Information Resources, Inc.; London House, Inc.; Corporate Education Resources, Inc.; Conceptual Systems, Inc.; Consultants for Management Decisions (CMD).

Conclusions:

- The ARS would benefit from adopting an automated workforce planning and forecasting information system. The essential elements for implementation should be -- 1) an automated system using decision support software and available databases; 2) top management support; 3) management accountability; 4) integration with other planning processes; 5) focus on major planning issues; and 6) a simple, systematic, and well documented process using good data and allowance for measurable results. Established time tables and phases for implementation will be needed. Computer specialists should be identified to work in a planned and coordinated fashion and to establish a national network of information; the system

should be user friendly with systematic organization for input; it should allow for all types of quantitative information and raw data; it must be kept current with frequent updates and include a mechanism for data validation; and it must meet the needs of current and future ARS Program Plans/6-Year Implementation Plans.

- A realistic budget estimate for implementation of the system will need to be developed and funds and other resources be made available. Implementation of a workforce forecasting system and a comprehensive and dynamic staffing plan should be tied in with the Agency's budget process. The economic benefits of the initiative need to be developed more clearly and effectively in order to win broad support.

Appendix 6. Selected Databases Which Would be Useful in Developing the ARS Workforce Forecasting System.

The following workforce databases from government agencies and other institutions were surveyed and evaluated for applicability to ARS needs:

US Dept. of Energy (DOE)
US Dept. of Labor (DOL)
US Office of Personnel Management (OPM)
US Dept. of Agriculture Office of Personnel (USDA/OP)
US Dept. of Education (ED)
US Census Bureau
US Bureau of Labor Statistics (BLS)
US Office of Equal Employment Opportunity (EEO)
Educational Testing Services, Princeton, NJ (SAT, GRE)
National Institutes of Health (NIH)
National Aeronautics and Space Administration (NASA)
National Science Foundation (NSF)
Public Institutions of Higher Learning
 1890 Landgrant Institutions (16 total)
 State Universities (approximately 30 selected to represent all geographic regions of the contiguous 48 states)
 High School Program on Expanding Horizons in Science and Mathematics

Findings:

- The most useful and comprehensive database encountered was that of the National Science Foundation (NSF). The data are drawn from a broad array of sources, including most of the other individual government agencies and educational institutions contacted. The retrospective data are coupled with demographic considerations and population and immigration trends to formulate predictions of the future supply and demand for scientists and engineers in the US. There appears to be no comparable resource for the type of information needed by PAT #1 to accomplish its objectives.
- Useful but fragmented information was available from most US government sources; differences among agencies in needs and priorities for database information limits the usefulness of these databases for application to PAT #1 objectives.
- Public Institutions of Higher Learning record their own data related to ethnic background, subject matter enrollment and gender distribution of their individual student populations. This information is collated and summarized annually by the US Dept. of Education as IPEDS (Integrated Postsecondary Education Data System). The information is mostly retrospective and therefore of limited value as a current index of the workforce profile. However, the 1890 institutions are recording valuable information on trends in study disciplines and in total enrollment of minorities in these Universities, which should enhance opportunities to identify appropriate strategies for increased ethnic diversity in ARS.

- The High School Program on Expanding Horizons in Science and Mathematics is an incentive program designed to retain and attract female high school students for post-secondary education in science and mathematics. Although it is in the formative stage of development, the program may prove to be a valuable vehicle for future recruitment of females into science. This and similar programs directed toward attraction (grades 1 through 8) and retention (senior high school) of students into science careers (see NSF, Future Scarcities of Scientists and Engineers: Problems and Solutions, 1990) should be included in future planning strategies for ARS Workforce Forecasting and Planning.
- The data available from the Educational and Testing Service (SAT and GRE) provides average test scores for high school students (SAT) and college students (GRE) in verbal and mathematic skills, but provides no predictive insight above that offered by other databases relative to workforce forecasting. Trends in ethnic and geographic background are reported annually. This information contributes to the NSF database, as in the case of most other institutional databases surveyed.

Conclusions:

- Use the ARS Workforce Profile 1990 document and the ARS Program Plan: Six-Year Implementation Plan 1992-1998 as the starting point for developing the ARS WFS.
- Adapt the National Science Foundation Database as the prototype for remodeling the existing ARS databases (ARS Workforce Profile 1990 and ARS Program Plan: Six-Year Implementation Plan) to accommodate the PAT #1 Objectives; utilize the NSF document, "Future Scarcities of Scientists and Engineers: Problems and Solutions, 1990", in developing the WFS.
- Incorporate the elements of the ARS ARMP document, including budgetary considerations, into the Workforce Forecasting and Planning System, and ultimately into the staffing plan.
- Create a coordinated effort between secondary schools and institutions of higher education to attract and retain students in science, particularly by encouraging the growth and flourishing of new programs such as the High School Program on Expanding Horizons in Science and Math. (It is recognized that this recommendation is inappropriate for PAT #1, but should be considered by the ISC.)

Appendix 7. Chart Showing Outputs from the ARS Workforce Forecasting System

Significant Users of Outputs from Workforce Forecasting System						
Users	Current Workforce Profile	Current & Projected Vacancies	Current & Projected Skills Needs	Projected Attrition	List of Current Skills Available	Workforce Demographics Current/Projected
						Training Opportunities
Administrator	X	X	X	X	-	X
• EEO Office	X	-	-	X	-	-
• International	X	-	-	X	-	X
• Information	-	-	X	-	X	-
• OCI	-	-	X	-	X	-
National Program Staff	X	X	X	X	X	X
Administrative Management	X	X	X	X	X	X
Area	X	X	X	X	X	X
Research Centers	-	X	X	X	X	X
Locations	-	X	X	X	X	X
Management Units	-	X	X	X	-	X
Employees	-	X	X	-	-	X
• Current	-	X	X	-	-	X
• Prospective	-	X	X	-	-	X



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